

**REMARKS:**

Claims 1-6 are in the case and presented for consideration.

Claim 1 has been amended

**CLAIM OBJECTIONS**

Claim 1 has been amended to provide proper antecedent basis in accordance with Examiner's comments and to add greater consistency with the specification. Thus, Applicants believe claim 1 to be in proper form.

**REJECTIONS UNDER 35 U.S.C. §103(a)**

Claims 1-6 were rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant disclosure in view of either of United States Patent 4,449,701 to Pitzer et al ("Pitzer") or United States Patent 4,417,723 to Kitamura et al. ("Kitamura").

Applicants respectfully disagree with Examiner's conclusion that use of a central encased refractory component in the present invention would have been an obvious modification to one of ordinary skill in the art.

In the present invention, the central tube 8 which is filled with refractory material affords protection against liquid metal (steel) break-outs through the operating channels.

However, neither Pitzer nor Kitamura teach the use of a central encased

refractory component for protection against break-out of the liquid metal through the operating channels. Instead, Pitzer and Kitamura teach the use of such a component to extend operating life.

In Pitzer the implementation of the refractory material 28 within the pipe 24 helps to the cooling of the abovementioned pipe thereby extending operating life of the whole device - see "Yet another object of the invention is to provide a new and improved tuyere for metallurgical vessels wherein cooler operation is achieved, thereby extending tuyere and refractory life" Col. 1, ln. 35-38 ; See also "As those skilled in the art will appreciate, the inlet pipe 22 is connected to a suitable source of inert gas such as argon, nitrogen or carbon dioxide and which is delivered through the annular gap 26 between the tuyere pipes 12 and 24. As a result, the gas flow is maintained along the surface of the pipes 12 and 24 to promote cooling and thereby increase tuyere and refractory life." Col. 2, ln. 57-64.

Similarly, in Kitamura the implementation of a refractory material 9 within the tube 7 improves the refractory quality of the tube's walls and reduces erosion. Kitamura states that

"[i]n a tuyere of such construction, if the refractory core material 9 is removed and the tuyere is of a simple double-tube construction (FIG. 2), the bubbles which are released from the inner tube 7 of a large diameter are naturally increased in size to impose a greater mechanical influence on the occasion of back attacks as mentioned

hereinbefore, accelerating the erosion of the refractory walls of the furnace. On the contrary, if the inner cavity of the inner tube 7 is filled with a refractory material 9 to blow in a gas solely through the annular spout 13 which is defined between the inner and outer tubes 7 and 8, the size of bubbles are reduced in general so that they do not have so strong an influence as would accelerate the erosion of the refractory walls. In order to weaken the back attacks, it is desired to make the width of the gap between the inner and outer tubes 7 and 8 as small as possible, more particularly, to make the width of the gap smaller than 3 mm, preferably smaller than 2 mm."

Col. 5, ln. 15-33.

Therefore, because Pitzer and Kitamura teach use of a central encased refractory component for a completely different purpose than the present invention, and because neither reference discloses or suggests use of a central encased refractory component to solve the problems addressed by the present invention, use of such a component would not be obvious to one of ordinary skill in the art in the context of the present invention.

Additionally, currently amended claim 1 is the sole independent claim from which all other claims currently in the case depend.

Accordingly, the application and claims are believed to be in condition for allowance, and favorable action is respectfully requested.

No new matter has been added.

If any issues remain, the Examiner is respectfully invited to contact the undersigned at the number below, to advance the application to allowance.

Respectfully submitted,

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